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The following papers were read, viz. :

1. " Meteorological Register kept at Port Arthur, Van Diemen's Land, during the year 1838, and Register of Tides at Port Arthur, from August 1838 to July 1839, both inclusive." By Deputy-Assistant-Commissary-General Lempriere. Communicated by Sir John Franklin, R.N., F.R.S., &c.

2. " Notice relative to the form of the Blood-particles of the *Ornithorhynchus hystrix*." By John Davy, M.D., F.R.S.

A portion of the blood of the *Ornithorhynchus hystrix*, mixed when fresh with a strong solution of common salt, being examined by the author, exhibited a few globules of irregular shape. Another portion, preserved in syrup, contained numerous globules, most of which had an irregular form, but many were circular; none, however, were elliptical, like those of birds. Hence the author concludes, that in form they accord more with those of Mammalia.

3. " Researches on Electro-chemical equivalents, and on a supposed discrepancy between some of them and the atomic weight of the same bodies, as deduced from the theory of isomorphism." By Lieut.-Colonel P. Yorke. Communicated by Michael Faraday, Esq., D.C.L., F.R.S., &c.

The author describes various experiments made with a view to determine the electro-chemical equivalents of sodium and potassium. Three experiments gave, respectively, 22·3, 22·9, and 25, as the equivalent of the former; and two other experiments gave, respectively, 45 and 41·7, as the equivalent of the latter of these substances. He then inquires what would be the result of the electrolyzation of the aqueous solutions of soda and potash, on the hypothesis of these bodies being composed of two equivalents, or atoms, of metal, and one of oxygen. To determine this question he employs a solution of dichloride of copper in muriatic acid, as being a substance composed of two atoms of metal and one of an electro-negative element. Its electrolysis gave as the equivalent of copper, 52·8, 59·4, and 61·6, numbers approximating closely to 63·2, or double the atomic weight of copper. After a long train of investigation, he concludes that there is no reason deducible from the theory of isomorphism for doubting the correctness of the received atomic weights of silver, sodium, &c., but that the difficulty, or anomaly, if it may be so called, should be considered as attaching itself to the di-compounds of copper; and that Faraday's propositions on this subject remain unimpeached.

4. " Second series of Approximate Deductions made from about 50,000 observations taken during the years 1836, 1837, and 1838, at the P. Louis Observatory, Mauritius, four times each day; namely, at 8 A.M., at noon, and at 4 and 8 P.M." By J. A. Lloyd, Esq., F.R.S.

5. " On the Solubility of Silica by Steam; with an account of an experiment on the subject, conducted in the East Indies by

Julius Jeffreys, late of the Hon. East India Company's Medical Establishment."

The inner surfaces of a flue built of siliceous bricks appeared to be deeply eroded by the passage over it of steam at a very high temperature, and fragments of siliceous materials laid in the course of the current were partially consumed. A siliceous crust was deposited on several vessels of stone ware, coated with a micaceous glaze, placed in the upper part of the furnace, and this crust was re-dissolved when the vessels were removed to a hotter situation in the same furnace. The author notices the experiments of Dr. Turner and others, which failed in showing the solubility of silica by steam, in consequence, as he conceives, of the heat having not been sufficiently great to effect the solution.

June 4, 1840.

The MARQUIS of NORTHAMPTON, President, in the Chair.

Justus Liebig, Johannes Müller, and Jacques Charles François Sturm, were severally elected Foreign Members of the Society.

The Right Rev. the Lord Bishop of Norwich, Lieut. Thomas Cook, R.N., and William Hutton, Esq., were balloted for, and duly elected into the Society.

A paper was read, entitled, "Contributions to the Chemical History of Archil and of Litmus." By Robert Kane, M.D., M.R.I.A. Communicated by Francis Baily, Esq., V.P.R.S.

After a preliminary sketch of the labours of Heeren and of Robiquet in investigating the origin of the beautiful colouring materials termed *Archil* and *Litmus*, obtained from different kinds of colourless lichens, and their detection of the two proximate principles termed *erythrine* and *orceine*, the author states the object of the inquiries detailed in the present paper to be threefold; viz. first, to ascertain the primitive form of the colour-making substance in a given species of lichen, and trace the stages through which it passes before the coloured substance is developed; secondly, to determine the nature of the various colouring substances which exist in the archil of commerce; and thirdly, to examine the colouring materials of ordinary litmus. He finds in the lichen *Roccella tinctoria* the following bodies, either pre-existing in the plant, or formed during the processes employed for its analysis: 1. Erythryline; 2. Erythrine (the Pseudo-erythrine of Heeren); 3. Erythrine bitter; 4. Telerythrine; and 5. Roccelline (the Roccellic acid of Heeren). The properties and constitution of these substances are then described, and the chemical formulæ given, which are deducible from their respective analyses. The author finds the archil of commerce to consist essentially of three ingredients, namely, orceine, erythroleic acid, and azoerythrine; of each of the two former there exist two modifications,